

CURRICULUM VITAE

HOWARD BRADLEY SHAFFER

Section of Evolution and Ecology
University of California, One Shields Ave.
Davis, California 95616
530-752-2939 (voice); 1449 (fax)
hbshaffer@ucdavis.edu (email)
<http://www2.eve.ucdavis.edu/shafferlab>

Education:

University of Chicago Ph.D. in Evolutionary Biology December 1982
University of California, Berkeley B.A. in Biology June 1976

Current Position:

Professor, Section of Evolution and Ecology &
Director, Center for Population Biology

Major Grants and Awards (1990-present):

Caltrans grant "Understanding terrestrial movement of the California tiger salamander, *Ambystoma californiense*" 2005-2006, \$250,000.00

NSF grant "Collaborative Research: Gauging introgression: Variation across the genome in mode and tempo of natural selection in a tiger salamander hybrid zone" 2005-2008, \$400,353.00 (\$238,705 to UCD)

NSF grant "Genetics, ethics, and systematics: A workshop for turtles" 2005-2006, \$51,283.00

UC Integrated Pest Management, Exotic/Invasive Pests and Diseases Research Program "Ecological influences on invasion success of introduced genes in California tiger salamanders" 2004-2006, \$118,200.00 (direct costs)

NSF grant "Reconstructing Pleistocene range shifts in North American ectothermic vertebrates" 2002-2005, \$308,756.00.

CalFed grant "Genetic identification of watershed-dependent species of special concern in the Central Valley" 2002-2005, \$851,660.00 (co-PI with Tom Smith: UCD budget, \$397,130)

EPA "Hybridization between an invasive exotic and a declining native amphibian: Molecular characterization, ecological dynamics and genetic remediation" 2001-2004 \$433,708.00

USFWS "Microsatellite analysis and terrestrial habitat requirements of the California tiger salamander, *Ambystoma californiense*" 2001-2003, \$100,000.00

USFWS "Microgeographic analysis of genetic variation in the endangered Santa Barbara tiger salamander (\$45,000.00) and the Santa Cruz long-toed salamander (\$25,000.00)" 2001-2003. (two awards, \$70,000 total)

NSF grant "The genetic consequences of long generation times in turtles" 1998-2001, \$150,000.00 plus 1 REU supplement (\$5,000.00)

Australian Research Council grant " Genetic differentiation among populations of freshwater turtle in eastern Australia, and its relationship to the history of population contraction and expansion in response to recent glacial events 1998 (Arthur Georges, University of Canberra co-PI), \$29,775.

3 awards from California state and county agencies for population genetics work on hybridization and genetic identification of California tiger salamanders, 1998-1999 (approximately \$65,000.00 total)
NSF grant "The genetic and physiological basis of life cycle convergence among Mexican ambystomatids" 1995-1999, \$317,000.00 plus 3 REU supplement (\$15,000.00)
NSF grant "The Cladogenetic Record for Turtles: Paleontological Dates, DNA Sequences, and a Test of the Molecular Clock" 1993-1996, \$199,000.00 plus 2 REU supplements (\$10,000.00)
NSF grant (Dissertation Improvement Grant for David M. Parichy) "Developmental analysis of morphological evolution: Convergence, divergence, and the origin of novelties in salamander pigment patterns" 1995-1996 \$14,000.00
NSF grant (Dissertation Improvement Grant for Karen Marchetti)- "Significance of inter-specific variation in plumage patterns of birds" 1993-1994, \$11,900.00.
National Park Service Cooperative Agreement, "Cooperative Agreement on Amphibian Population Genetics" 1993-1997, approx. \$140,000.00
NSF grant "Speciation and Phylogenetic Diversification in a Polytypic Species" 1990-1993 \$121,877.00 plus 8 REU supplements (\$40,000.00) and 1 ROA supplement (\$12,800.00)
California State Fish and Game Research Contract "Distribution and Status of the Endemic California Tiger Salamander" 1990-1993 \$50,000 (approximate budget)

Research in Progress:

Continued studies on the molecular and morphological evolution and systematics of amphibians and reptiles
Quantitative genetics/QTL analysis of salamander metamorphosis
Genetics and management of declining amphibians and reptiles

Elected and Appointed Positions:

Conservation Committee, American Society of Ichthyologists and Herpetologists 2005-8
Fitch Committee, American Society of Ichthyologists and Herpetologists, 2005-08
Axolotl Colony advisory committee, 2004-present
IUCN/SSC Tortoise and Freshwater Turtle Specialist Group 2003-present
Council, American Genetics Association, 2003-2006
Council Member, Society of Systematic Biologists, 2002-2005
Board of Governors, American Society of Ichthyologists and Herpetologists 1984-89
Board of Governors, American Society of Ichthyologists and Herpetologists 1998-2003
Council Member, Society of Systematic Zoologists (class of 1990)
Associate Editor, Annual Reviews of Ecology and Systematics, 2001-2006
Associate Editor, Ecological Applications (1997-2000, 2000-2003)
Associate Editor, Zoological Journal of the Linnean Society, 1999-2004
Associate Editor, Molecular Systematics and Evolution, Herpetologica (1988-1995)
Associate Editor, Evolution Jan 1991-Dec 1993
Editorial Board Member, Annual Reviews of Ecology and Systematics, (1996-2001)
Editorial Board, Herpetological Conservation (appointed March, 1994-present)
California/Nevada Workgroup & National Workshop member, Declining Amphibian Task Force
NBS/BRD Workgroup to Develop a National Amphibian Monitoring System (1994-present)
North Cascades National Park Research Review Panel, June, 1993

National Science Foundation Panelist (NSF), Frontiers in Integrative Biological Research (FIBR)
December, 2003

NSF panelist, Population Biology Panel: April 1992, October 1993, April 1994, April 2000, April 2002
NSF Panelist, Dissertation Improvement Grants for Evolutionary and Ecological Physiology, April, 1995

NSF Panelist, Dissertation Improvement Grants for Systematic Biology, February, 1997
Special publications committee, American Assoc. of Ichthyologists and Herpetologists, (1999-present)
Program Officier, Bay Area Biosystematists (2000-01)
EPA Panelist, Terrestrial ecosystems (2001)
NEON workshop participant, NSF (2002)
IUCN working group on Asian Turtle Crisis, (2001-present)
E.O. Wilson Award Committee, ASN (2001)

Awards and Honors:

Distinguished Scholarly Public Service Award, UC Davis, 2004-2005
Visiting Scholar, University of Canberra 2004
Editorial Board, Chelonian Conservation and Biology (2003-present)
Kyushu University, Japan 2003 (Distinguished Lecturer)
Teaching Excellence Award, Northern California chapter, Phi Beta Kappa, 2002
UC Davis Division of Biological Sciences Outstanding Teaching Award, 2002
Research Associate, Museum of Vertebrate Zoology, Berkeley 2002-present
Fellow, California Academy of Sciences (elected for life in 2001)
Vice-Chancellors Visiting Scholar, University of Canberra 1995-96

Positions Held:

Affiliate Graduate Faculty, Eastern Carolina University 1988
Assistant Professor, Ecology and Evolutionary Biology, University of California, Irvine 1985-87
Visiting Scholar, University of Chicago 1984-85
Post-doctoral Research Fellow (with Dr. William Atchley) 1983-84
Post-doctoral Research Fellow (with Dr. Russell Lande) 1983
Research Associate, Field Museum of Natural History

Symposia Organized and Special Exhibits:

Genetics, ethics, and systematics: A workshop for turtles (NSF funded workshop held at the Museum of Comparative Zoology, Harvard University, 2005)

Declining Amphibians in Western North America (symposium organized for the Western Society of Naturalists, 1998)

Systematics of Model Organisms (symposium co-organizer for Society of Systematic Biologists, 1992).

Molecular Biology of Axolotls and other Urodeles (Provocateur on urodele evolutionary biology, International Workshop, 1993).

Pacific Grove Natural History Museum, special exhibit on Declining California Amphibians (1994)

Publications:

73. Krenz, J. G., G.J.P. Naylor, H. B. Shaffer and F. J. Janzen. 2005. Molecular phylogenetics and evolution of turtles. Molecular Phylogenetics and Evolution 37:178-191.
72. Trenham, P.C. and H. B. Shaffer. 2005. Amphibian upland habitat use and its consequences for population viability. Ecological Applications 15:1158-1168.
71. Spinks, P. Q. and H. B. Shaffer. 2005. Range-wide molecular analysis of the western pond turtle (*Emys marmorata*): cryptic variation, isolation by distance, and their conservation implications. Molecular Ecology 14:2047-2064.
70. Shaffer, H. B. 2005. *Ambystoma gracile* (Baird, 1859) Northwestern salamander. Pp. 609-611 In Lannoo, M.J. (Ed.), Amphibian declines. The conservation status of United States species. University of California Press, Berkeley, California.
69. Shaffer, H. B. and P. C. Trenham. 2005. *Ambystoma californiense* (Gray, 1853) California tiger salamander. Pp. 605-608 In Lannoo, M.J. (Ed.), Amphibian declines. The conservation status of United States species. University of California Press, Berkeley, California.
68. Near, T. J., P. A. Meylan and H. B. Shaffer. 2005. Assessing concordance of fossil calibration points in molecular clock studies: an example using turtles. American Naturalist 165:137-146.
67. Engstrom, T.N., H. B. Shaffer and W. P. McCord. 2004. Multiple data sets, high homoplasy, and the phylogeny of softshell turtles (*Testudines: Trionychidae*). Systematic Biology 53:693-710.
66. Shaffer, H. B., G. B. Pauly, J. C. Oliver and P. C. Trenham. 2004. The molecular phylogenetics of endangerment: cryptic variation and historical phylogeography of the California tiger salamander, *Ambystoma californiense*. Molecular Ecology 13:3033-3049.
65. Shaffer, H. B., G. M. Fellers, S. R. Voss, J. C. Oliver and G. B. Pauly. 2004. Species boundaries, phylogeography, and conservation genetics of the red-legged frog (*Rana aurora/draytonii*) complex. Molecular Ecology 13:2667-2677.
64. Fitzpatrick, B. J. and H. B. Shaffer. 2004. Environment-dependent admixture dynamics in a tiger salamander hybrid zone. Evolution 58(6):1282-1293.
63. Spinks, P. Q., H. B. Shaffer, J. B. Iverson and W. P. McCord. 2004. Phylogenetic hypotheses for the turtle family Geoemydidae. Molecular Phylogenetics and Evolution 32:164-182.

62. Fujita, M.K., T.N. Engstrom, D.E. Starkey and H.B. Shaffer. 2004. Turtle phylogeny: Insights from a novel nuclear intron. Molecular Phylogenetics and Evolution 31:1031-1040.
61. Riley, S.P.D., H.B. Shaffer, S.R. Voss and B.M. Fitzpatrick. 2003. Hybridization between a rare, native tiger salamander (*Ambystoma californiense*) and its introduced congener. Ecological Applications 13(5):1263-1275.
60. Shaffer, H. B. 2003. Mole salamanders (Ambystomatidae). Pp. 355-361 In Hutchins, M., Duellman, W. E., and Schlager, N. (Editors) Grzimek's Animal Life Encyclopedia. Second edition. Volume 6, *Amphibians*, Gale Group, Farmington Hills, MI.
59. Spinks, P.Q., G.B. Pauly, J.J. Crayon and H.B. Shaffer. 2003. Survival of the western pond turtle (*Emys marmorata*) in an urban environment. Biological Conservation 113(2):257-267.
58. Voss, S. R., K. Prudic, J. Oliver, and H.B. Shaffer. 2003. Candidate gene analysis of metamorphic timing in ambystomatid salamanders. Molecular Ecology 12:1217-1223.
57. Starkey, D.E., H.B. Shaffer, R. R. Burke, M.R.J. Forstner, J. B. Iverson, F. J. Janzen, A. G.J. Rhodin, and G. R. Ultsch. 2003. Molecular Systematics, Phylogeography, and the Effects of Pleistocene Glaciation in the Painted Turtle (*Chrysemys picta*) Complex. Evolution 57(1):119-128.
56. Davidson, C., H. B. Shaffer and M. R. Jennings. 2002. Spatial tests of the pesticide drift, habitat destruction, UV-B and climate change hypotheses for California amphibian declines. Conservation Biology 16(6):1588-1601.
55. Sanderson, M.J. and H.B. Shaffer. 2002. Troubleshooting molecular phylogenetic analyses. Annual Reviews of Ecology and Systematics 33:49-72
54. Engstrom, T.N., H.B Shaffer, and W.P. McCord. 2002. Phylogenetic diversity of endangered and critically endangered southeast Asian softshell turtles (Trionychidae: *Chitra*). Biological Conservation 104:173-179.
53. Iverson, J. B., P. Q. Spinks, H. B. Shaffer, W. P. McCord and I. Das. 2001. Phylogenetic relationships among the Asian tortoises of the genus *Indotestudo* (Reptilia: Testudines: Testudinidae). Hamadryad 26:271-274.
52. Trenham, P.C., W. D. Koenig and H. B. Shaffer. 2001. Spatially autocorrelated demography and interpond dispersal in the salamander *Ambystoma californiense*. Ecology 82:3519-3530.
51. Davidson, C., H. B. Shaffer and M. R. Jennings. 2001. Declines of the California red-legged frog: climate, UV-B, habitat, and pesticides hypotheses. Ecological Applications 11:464-479.
50. Shaffer, H.B. 2001. Neoteny. Pps. 1304-1305 In: Encyclopedia of Genetics. London: Academic Press.

49. Voss, S. R. and H. B. Shaffer. 2000. Evolutionary Genetics of Metamorphic Failure Using Wild-Caught vs. Laboratory Axolotls (*Ambystoma mexicanum*). Molecular Ecology 9:1401-1407.
48. Voss, S. R., H. B. Shaffer, J. Taylor, R. Safi, and V. Lauder. 2000. Candidate gene analysis of thyroid hormone receptors in metamorphosing vs. non-metamorphosing salamanders. Heredity 85:107-114.
47. Trenham, P. C., H. B. Shaffer, W. D. Koenig and M. R. Stromberg. 2000. Life history and demographic variation in the California Tiger Salamander (*Ambystoma californiense*). Copeia 2000:365-377.
46. Shaffer, H. B., G. M. Fellers, A. Magee and S. R. Voss. 2000. The genetics of amphibian declines: population substructure and molecular differentiation in the Yosemite Toad, *Bufo canorus* (Anura, Bufonidae) based on single-strand conformation polymorphism analysis(SSCP) and mitochondrial DNA sequence data. Molecular Ecology 9:245-257.
45. McCord, W. P., J. B. Iverson, P. Q. Spinks, and H. B. Shaffer. 2000. A new genus of geoemydid turtle from Asia. Hamadryad 25:20-24.
44. Trenham, P. C., H. B. Shaffer and P. B. Moyle. 1998. Biochemical identification and assessment of population structure of morphologically similar native and invading smelt species (*Hypomesus*) in the Sacramento-San Joaquin Estuary, California. Transactions of the American Fisheries Society 127:417-424.
43. Shaffer, H. B., R. N. Fisher and C. Davidson. 1998. The role of natural history collections in documenting species declines. Trends in Ecology and Evolution 13:27-30.
42. McKnight, M. L. and H. B. Shaffer. 1997. Large, rapidly evolving intergenic spacers in the mitochondrial DNA of the salamander family Ambystomatidae (Amphibia: Caudata). Molecular Biology and Evolution, 14:1167-1176.
41. Voss, S. R. and H. B. Shaffer. 1997. Adaptive evolution via a major gene effect: Paedomorphosis in the Mexican axolotl. Proceedings of the National Academy of Sciences, USA. 94:14185-14189.
40. Shaffer, H. B. P. Meylan and M. L. McKnight. 1997. Tests of turtle phylogeny: molecular, morphological and paleontological approaches. Systematic Biology 46:235-268.
39. Irschick, D. J. and H. B. Shaffer. 1997. The polytypic species revisited: Morphological differentiation among tiger salamanders (*Ambystoma tigrinum*) (Amphibia: Caudata). Herpetologica, 53:30-49.
38. Janzen, F. J., S. L. Hoover and H. B. Shaffer. 1997. Molecular phylogeography of the western pond turtle (*Clemmys marmorata*): Preliminary results. Chelonian Conservation and Biology 2:623-626.

37. Voss, S. R. and H. B. Shaffer. 1996. What insights into the developmental traits of urodeles does the study of interspecific hybrids provide? International Journal of Developmental Biology, 40: 885-893.
36. Fisher, R. N. and H. B. Shaffer. 1996. The decline of amphibians in California's Great Central Valley Conservation Biology, 10:1387-1397.
35. Shaffer, H.B. and M. L. McKnight. 1996. The polytypic species revisited: genetic differentiation and molecular phylogenetics of the tiger salamander (Ambystoma tigrinum) (Amphibia: Caudata) complex. Evolution, 50:417-433.
34. Shaffer, H. B. and S. R. Voss. 1996. Phylogenetic and mechanistic analysis of a developmentally integrated character complex: Alternate life history modes in ambystomatid salamanders. American Zoologist, 36(1):24-35.
33. Stanley, S., P. B. Moyle and H. B. Shaffer. 1995. Allozyme analysis of Delta Smelt, Hypomesus transpacificus and Longfin Smelt, Spirinchus thaleichthys in the Sacramento-San Joaquin estuary, California. Copeia, 1995:390-396.
32. Wade, M. J., M. L. McKnight and H. Bradley Shaffer. 1994. The effects of kin-structured colonization and stepping-stone range expansion on nuclear and cytoplasmic gene diversity. Evolution, 48:1114-1120.
31. Barry, S. J. and H. B. Shaffer. 1994. The status of the California Tiger Salamander (Ambystoma californiense) at Lagunita: A fifty-year update. Journal of Herpetology 28:159-164.
30. Zhao, E.-M., R. F. Inger, G.-F. Wu, and H. B. Shaffer. 1994. Morphological variation and ecological distribution of co-occurring larval forms of Oreolalax (Anura: Pelobatidae). Amphibia-Reptilia, 15:109-121.
29. Shaffer, H.B., R.A. Alford, B.D. Woodward, S.J. Richards, R. G. Altig and C. Gascon. 1994. Quantitative sampling of amphibian larvae. Pps 130-141 in W.R. Heyer et al., editors, Measuring and Monitoring Biological Diversity: Standard Methods for Amphibians. Smithsonian Institution Press, Washington, D.C..
28. Shaffer, H.B. and E. Juterbock. 1994. Night driving. Pps. 163-166 in W.R. Heyer et al., editors, Measuring and Monitoring Biological Diversity: Standard Methods for Amphibians. Smithsonian Institution Press, Washington, D.C.
27. Shaffer, H. B. 1993. Systematics of model organisms: The laboratory axolotl, Ambystoma mexicanum. Systematic Biology 42:508-522.
26. Kellogg, E. A. and H. B. Shaffer. 1993. Model organisms in evolutionary studies. Systematic Biology 42:409-414.

25. Wu, Guan-Fu, Zhao, Er-Mi, Inger, R. F. and H. B. Shaffer. 1993. A new frog of the genus Oreolalax (Pelobatidae) from Sichuan, China. J. Herpetology, 27:410-413.
24. Lauder, G.V. and H.B. Shaffer. 1993. Design of feeding systems in aquatic vertebrates: Major patterns and their evolutionary interpretations. pps 113-149 in J. Hanken and B.K. Hall, eds. The Skull, vol 3. University of Chicago Press.
23. Austin, C.C. and H.B. Shaffer. 1992. Short, medium, and long term repeatability of locomotor performance in the tiger salamander Ambystoma californiense. Functional Ecology 6:145-153.
22. Shaffer, H.B., J.M. Clark, and F. Kraus. 1991. When molecules and morphology clash: A phylogenetic analysis of the North American ambystomatid (Caudata:Ambystomatidae) salamanders. Systematic Zoology 40(3): 284-303.
21. Shaffer, H.B., C.C. Austin, and R.B. Huey. 1991. The consequences of metamorphosis on salamander (Ambystoma) locomotor performance. Physiological Zoology 64(1): 212-231.
20. Inger, R.F., E. Zhao, H. Bradley Shaffer, and G. Wu. 1990. Report on a collection of amphibians and reptiles from Sichuan, China. Fieldiana Zoology, #58.
19. Shaffer, H.B. and F. Breden. 1989. The relationship between allozyme variation and life history: Non-transforming salamanders are less variable. Copeia 1989(4):1016-1023.
18. Shaffer, H.B. 1989. Natural history, ecology, and evolution of the Mexican "Axolotls". Axolotl Newsletter #18:5-12.
17. Shaffer, H.B. 1988. Size and scaling in the indian frogs Nyctibatrachus and Nannobatrachus (Ranidae). Fieldiana Zoology, #46.
16. Shaffer, H.B. and G.V. Lauder. 1988. The ontogeny of functional design: Metamorphosis of feeding behavior in the Tiger Salamander (Ambystoma tigrinum). Journal of Zoology, London 216:437-454.
15. Lauder, G.V. and H.B. Shaffer. 1988. The ontogeny of functional design: Are motor patterns conserved during major morphological transformations? Journal of Morphology 197:249-268.
14. Inger, R.F., H.B. Shaffer, M. Koshy and R. Bakde. 1987. Ecological structure of a herpetological assemblage in South India. Amphibia-Reptilia 8: 189-202.
13. Shaffer, H.B. 1986. The utility of quantitative genetic parameter estimates in character weighting. Systematic Zoology 35(1): 124-134.
12. Shaffer, H.B. and G.V. Lauder. 1986. Aquatic prey capture in ambystomatid salamanders: Patterns of variation in muscle activity. Journal of Morphology 183: 273-284.
11. Lauder, G.V. and H.B. Shaffer. 1986. Functional design of the feeding mechanism in lower vertebrates: Unidirectional and bidirectional flow systems. Zool J. Linn Soc. 88: 277-290.

10. Shaffer, H.B. and G.V. Lauder. 1985. Patterns of variation in aquatic ambystomatid salamanders: Kinematics of the feeding mechanism. *Evolution* 39: 83-92.
9. Shaffer, H.B. and G.V. Lauder. 1985. Functional morphology of the feeding mechanism in aquatic ambystomatid salamanders. *Journal of Morphology* 185: 297-326.
8. Shaffer, H.B. 1984a. Evolution in a paedomorphic lineage. I. An electrophoretic analysis of the Mexican ambystomatid salamanders. *Evolution* 38: 1194-1206.
7. Shaffer, H.B. 1984b. Evolution in a paedomorphic lineage. II. Allometry and form in the Mexican ambystomatid salamanders. *Evolution* 38: 1207-1218.
6. Inger, R.F., H.B. Shaffer, M. Koshy and R. Bakde. 1984a. A report on a collection of amphibians and reptiles from the Ponmudi, Kerala, South India. Part 1. *Journal of Bombay Natural History Society* 81(2): 406-427.
5. Inger, R.F., H.B. Shaffer, M. Koshy and R. Bakde. 1984b. A report on a collection of amphibians and reptiles from the Ponmudi, Kerala, South India. Part 2. *Journal of Bombay Natural History Society* 81(3): 551-570.
4. Shaffer, H.B. 1983. Biosystematics of *Ambystoma rosaceum* and *A. tigrinum* in northwestern Mexico. *Copeia* 1983: 67-78.
3. Feder, M.E., J.F. Lynch, H.B. Shaffer and D.B. Wake. 1982. Field body temperatures of tropical and temperate zone salamanders. *Smithsonian Herpetological Information Services* #52.
2. Kiester, A.R., T. Nagylaki and B. Shaffer. 1981. Population dynamics of species with gynogenetic sibling species. *Theoretical Population Biology* 19(3): 358-369.
1. Shaffer, H.B. 1978. Relative predation pressure on salamanders (Caudata, Plethodontidae) along an altitudinal transect in Guatemala. *Copeia* 1978: 268-272.

Manuscripts in Press:

Weisrock, D. W., H. B. Shaffer, B. L. Storz, S. R. Storz, and S. R. Voss. Multiple nuclear gene sequences identify phylogenetic species boundaries in the rapidly radiating clade of Mexican ambystomatid salamanders. (*Molecular Ecology*).

Shaffer, H. B., D.E. Starkey and M. K. Fujita. Molecular insights into the systematics of the snapping turtles (Chelydridae). *in Biology of the Snapping Turtle*, Smithsonian Press.

Submitted Manuscripts:

Pauly, G. B., O. Piskurek, and H. B. Shaffer. Phylogeographic concordance in the southeastern United States: The flatwoods salamander as a test case. (Submitted to Molecular Ecology, 9 March 2006).

Lowe, W. H., and H. B. Shaffer. The genetics of post-glacial recolonization in the spring salamander, *Gyrinophilus porphyriticus* (Plethodontidae). (in revision for Molecular Ecology, first submitted 30 September, 2004).

Leyse, K. E., S. P. Lawler, H. B. Shaffer, and T. Strange. Responses of larval *Ambystoma* to differing densities of mosquitofish: context matters. (Submitted to Ecological Applications, 25 September, 2004).

Spinks, P.Q. and H. B. Shaffer. Conservation phylogenetics of the Asian box turtles (Geoemydidae, *Cuora*): using non-traditional biological materials in species conservation. (in revision for **Conservation Biology**, 10 October 2005).

Shaffer, H. B. **Reptiles**. (Submitted as an invited contribution to the **Companion to Evolution** to be published by Harvard University Press; edited by Joe Travis and Michael Ruse).

Fitzpatrick, B.M. and H.B. Shaffer. Managing invasive hybrids: Introduction history and habitat heterogeneity explain the landscape genetics of hybrid tiger salamanders. (submitted to **Ecological Applications, 3 March, 2006**).

Technical Reports:

Pauly, G. B. and H. B. Shaffer. 2005. Phylogenetic variation in mitochondrial DNA of the flatwoods salamander, *Ambystoma cingulatum*. Final Report, U.S. Fish and Wildlife Service.

Shaffer, H. B., R. N. Fisher and S. E. Stanley. 1993. Status Report: The California tiger salamander *Ambystoma californiense*. Final Report, California Dept. of Fish and Game.

Bishop, C., Bradford, D., Casper, G., Corn, S., Droege, S., Fellers, G., Geissler, P., Green, D., Heyer, R., Lannoo, M., Larson, D., Johnson, D., McDiarmid, R., Sauer, J., Shaffer, H.B., Whiteman, H., Wilbur, H. 1994. A Proposed North American Amphibian Monitoring.

Rodriguez, L. O., J. Perez Z. and H. B. Shaffer. 2001. Anfibios y Reptiles/Amphibians and Reptiles. pp. 69-74 &141-146 in Alverson, W.S., L.O. Rodriguez and D.K. Moskovits (eds.). Perú: Biabo Cordillera Azul. Rapid Biological Inventories Report 2. Chicago, Il.: The Field Museum.

Atkinson, A. J., B. S. Yang, R. N. Fisher, E. Ervin, T. J. Case, N. Scott and H. B. Shaffer. 2003. MCB Camp Pendleton Arroyo Toad monitoring protocol. Sacramento, CA. 41 pages.

Shaffer, H. B. and P. C. Trenham. 2002. Distinct population segments of the California tiger salamander, *Ambystoma californiense*. Report to the USFWS.

Shaffer, H. B., Zhang, Y, and Wang, T. 2003. Amphibians and Reptiles. Pp. 73-75, 99-100, plates 5,6 *in* Stotz, D. F., E. J. Harris, D. K. Moskovits, K. Hao, S. Yi and G. W. Adelmann (eds.). China: Yunnan, southern Gaoligongshan. Rapid Biological Inventories 04. Chicago, IL.: The Field Museum.

Book Reviews:

Shaffer, H. B. 2004. Amphibians, reptiles and a whole lot more. Review of "The Amphibians and Reptiles of Costa Rica. A Herpetofauna Between Two Continents, Between Two Seas." by Jay M. Savage. Conservation Biology 18(5):1440-1441.

Shaffer, H. B. 1998. Review of "Herpetology" by F Harvey Pough et al. Systematic Biology, 47(4):763-764.

Parichy, D. M., H. B. Shaffer and M. Mangel. 1992. Heterochrony as a unifying theme in evolution and development. Review of "Heterochrony: The evolution of ontogeny" by M. L. McKinney and K. J. McNamara. Evolution 46(4):1252-1254.

Griesemer, J. R. and H. B. Shaffer. 1992. Review of "Reconstructing the past: Parsimony, evolution and inference" by Elliot Sober. The Philosophical Review 101:725-729.

Shaffer, H.B. 1990. Review of Speciation and its consequences (Otte and Endler, eds.) Evolution 44(6):1711-1712.

Shaffer, H.B., and R.K. Grosberg. 1989. Review of Matsuda, R. Animal evolution in changing environments with special reference to abnormal metamorphosis. Copeia 1989(4):1121-1122.

Shaffer, H.B. 1983. Review of Metamorphosis: A problem in developmental biology. (Gilbert and Frieden, eds.) Herpetologica 39(3): 311-313.

Invited Seminars/Symposia (1990-present):

University of Kentucky, Lexington 2006

Society of Systematic Biologists, Stony Brook 2006

Okasaki Conference: Biology of Extinction, Okazaki, Japan 2006

Jepson Prairie Docent's Seminar, California Tiger Salamander Biology, Davis 2006

Simon Fraser University, Vancouver, Canada 2005

University of Nevada, Reno, 2005

The Wildlife Society, Santa Rosa, 2005

CSIRO, Canberra, Australia, 2004

University of Canberra, Australia 2004

First Okazaki Biology Conference: Biology of Extinction, Okazaki, Japan 2004

Wildlife Society, Santa Rosa, CA 2003 (2 lectures)

American Society of Ichthyologists and Herpetologists, Manaus 2003 (2 symposia)

University of Michigan, Ann Arbor 2003

Kyushu University, Japan 2003 (Distinguished Lecturer invitation)

University of Texas, Austin, 2003

Sacramento Zoological Society, Sacramento, 2002
Joint Meetings, ASIH, SSAR, and HL, Kansas City, MO 2002
Society for Conservation Biology, UC Davis chapter, 2002
Chico State University, Chico, CA 2002
Dartmouth College, Hanover, N.H. 2001
California Academy of Sciences "BioForum" speaker, 2001
Florida State University (elected yearly speaker by FSU graduate students), 2001
Wildlife Society, Declining CA amphibian symposium, Sacramento, 2001 (4 presentations)
San Benito Co. Habitat Conservation Plan Workshop, Hollister, 2000
Santa Ynez Natural History Society, Inaugural presentation, Santa Barbara, 2000
American Association of Ichthyologists and Herpetologists, La Paz, 2000
Field Museum of Natural History, Chicago, 2000
Geological Society of America symposium: Cenezoic Biogeography in North America, Denver, 1999
Colorado State University, Ft. Collins, 1999
Powdermill Conference on Freshwater Turtles, 1999
University of Nevada, Las Vegas, 1999
Harvard University, 1998
Sonoma State University, 1998
Western Society of Naturalists, San Diego, 1998
American Society of Ichthyologists and Herpetologists, Guelph, 1998
Washington State University, Pullman 1998
Bay Area Biosystematists, 1997
Simon Fraser University, Vancouver, B.C. 1997
American Association of Ichthyologists and Herpetologists, Seattle, 1997
University of California, Berkeley 1997
San Francisco State University, 1997
University of Queensland, Brisbane, Australia 1996
University of Canberra, Canberra, Australia 1996
ACT Herpetological Association, Australia 1996
Universidad Autonoma de Mexico, Mexico City 1996
DQ University, Davis 1995
Evolution of Development: Molecules, Mechanisms and Phylogenetics, Bodega Bay, 1995
University of California at Irvine 1995
University of Oregon, Eugene 1995
American Society of Zoologists, St. Louis, MO 1995
University of Massachusetts at Amherst 1994
Herpetologist League/SSAR, Athens, GA (2 symposia) 1994
California Academy of Sciences, San Francisco 1994
Western Association, Fish and Wildlife Agencies/Am. Fisheries Society, Sacramento 1993
Second International Herpetology Congress, Australia 1993
University of Chicago Nierman Scholar, Chicago, 1993
Washington University, St. Louis 1993
Florida State University, Tallahassee 1992
Pacific Grove Natural History Museum 1993
University of Washington, 1992
Society for the Study of Evolution/Systematic Biology, Berkeley, 1992

American Association of Ichthyologists and Herpetologists, Urbana, 1992
Herpetologist League/SSAR, El Paso, 1992
Smithsonian Institute Amphibian Workshop, Washington D.C. 1991
San Diego State University, 1991
National University of Mexico, (UNAM), Mexico City 1990
Center for Population Biology, Davis 1990
California Academy of Sciences, 1990
Biosystematists Invited Lecture, 1990

Presented Papers (1990-present):

American Society of Ichthyologists and Herpetologists Tampa, FL 2005 (4 presentations)
Ecological Society of America, Montreal 2004
Society for the Study of Evolution, Chico, CA 2003
Society for the Study of Evolution, Madison WI 1999
Society of Integrative and Comparative Biology (ASZ), Boulder, CO 1998
Society for the Study of Evolution, Boulder, CO 1997
American Society of Ichthyologists and Herpetologists Seattle, WA 1997
Society for the Study of Evolution, Athens, GA 1994
American Society of Zoologists, St. Louis, MO 1994
Society for the Study of Evolution, Snowbird, UT 1993
American Society of Zoologists, Vancouver 1992
California Population Genetics Meeting, Bodega Bay, CA, 1991
Society for the Study of Evolution, Hilo, Hawaii 1991
American Society of Zoologists, Atlanta, 1991
Biodiversity of the Rocky Mountains, Fort Collins, CO 1991
Fourth Int'l Congress, Systematic and Evol. Biol. College Park 1990

Conservation and Outreach Activities

Jepson Prairie Docent's Seminar, California Tiger Salamander Biology, Davis 2006
Invited participant, "Evolutionary hotspots" workshop (California State Parks) November, 2005
Scientific advisor, Caltrans working group on mitigation standards for California tiger
salamanders, October 2005
Invited speaker, Wildlife Society workshop on the Western Pond Turtle, Sonoma State
University, 16-17 April 2005
Invited speaker, California State Parks symposium on Genetic Monitoring. UC Davis, 16
February, 2005
ASIH Conservation Committee, 2005-present
CSIRO Researching with Scientists Scheme (2004): (for four Australian high-school students)
Reviewer for 2004 IUCN amphibians of the world project (Mexican ambystomatid salamanders)
"Conservation of the California Tiger Salamander"- Published interview **Environmental Review**
2004, 11(10): 1-8.
Invited speaker for the Yolo Basin Foundation's Flyway Nights Lecture Series, 2003
Invited scientific commentator/evaluator on the Proposed Rule to list the Central California
population segment of *Ambystoma californiense*, USFWS, 2003.

Invited speaker, Wildlife Society workshop on the California Tiger Salamander, Sonoma State University, 4-5 October, 2003

Member, Science Advisory team, Arroyo toad monitoring and survey study, Camp Pendleton, CA 2002

Member, Science Advisory Group for the Merced County NCCP/HCP 2002

Speaker on Amphibian Declines, Sacramento Zoological Society, Sacramento, 2002

Participant, Rapid Biological Inventory. China: Gaoligong Shan, Yunnan Prov. Field Museum of Natural History, 2002

Invited Participant, Wildlife Society/USFWS/SDFG workshop on the California Red-legged frog, Pt. Reyes, 8-9 April, 2002

Participant, California Academy of Sciences "Bioforum" program, 2001

Member, USFWS Santa Barbara tiger salamander recovery team, 2001-present

Member, Santa Cruz long-toed salamander recovery team, 2001-present

Participant, Rapid Biological Inventory. Perú: Biabo Cordillera Azul. Field Museum of Natural History, 2001

IUCN workshop on Asian Turtle Crisis (facilitator for systematic biology). Dallas January, 2001.

San Benito Co. Habitat Conservation Plan (HCP) Workshop, expert on the California Tiger Salamander. September, 2000

Santa Barbara Co. Emergency listing team for the USFWS on the Santa Barbara Tiger Salamander. Spring, 2000.

UC Davis Arboretum Speaker. Spring, 2000.

Member, Jepson Prairie Advisory Committee, ~1995-present